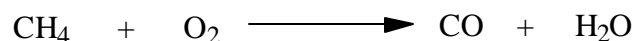
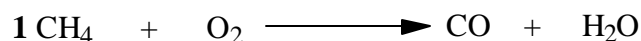


Using Algebra to Balance Chemical Equations

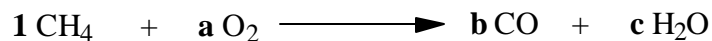
1. Write out the chemical equation.



2. Assign a value of 1 to the coefficient of the first compound.



3. Assign a variable to the other coefficients.



4. For each element, write an equality relating its amounts to the other variables.

Carbon	1CH_4	$b\text{CO}$	$1 \times 1(\text{C's subscript}) = b \times 1$	$b = 1$
Hydrogen	1CH_4	$c\text{H}_2\text{O}$	$1 \times 4(\text{H's subscript}) = c \times 2$	$4 = 2c$
Oxygen	$a\text{O}_2$	$b\text{CO} + c\text{H}_2\text{O}$	$a \times 2 = (b \times 1) + (c \times 1)$	$2a = b + c$

5. Solve for each variable.

$$b = 1 \qquad b = 1$$

$$2c = 4 \qquad c = 4/2 = 2 \qquad c = 2$$

$$2a = b + c \qquad a = (1 + 2)/2 \qquad c = 3/2$$

6. If necessary, multiply all variables and the 1st coefficient by a whole number to make all values whole numbers.

Multiply 1, a, b, & c times 2 to get 2, a = 3, b = 2, & c = 4

